

Appln no. 10/668,753
Amendment dated Nov. 24, 2004
Response to final Office Action of Sept. 24, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (previously presented) A structured abrasive article comprising:
 - (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article produces a first cut rate and a first surface finish at a first time and a second cut rate and a second surface finish at a second time, the first time and the second time being separated by at least 20 minutes;

wherein the second cut rate is no greater than 50% less than the first cut rate.

2. (original) The structured abrasive article according to claim 1, wherein the second cut rate is no greater than 30% less than the first cut rate.
3. (original) The structured abrasive article according to claim 2, wherein the second cut rate is no greater than 15% less than the first cut rate.
4. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles have an average particle size of at least 200 micrometers.
5. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles have an average particle size of about 100-400 micrometers.

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6. (original) The abrasive article according to claim 1, wherein the composites have a height, measured from the front face of the backing, of at least 600 micrometers.
7. (original) The abrasive article according to claim 6, wherein the composites have a height, measured from the front face of the backing, of at least 750 micrometers.
8. (previously presented) The abrasive article according to claim 1, wherein the abrasive composite comprises faces that are defined at least partially by a parabolic function.
9. (canceled)
10. (previously presented) The abrasive article according to claim 1, wherein the ceramic abrasive particles comprise ceramic abrasive particles that have been modified with at least one rare earth oxide modifier.
11. (previously presented) The abrasive article according to claim 1, wherein the ceramic abrasive particles comprise ceramic abrasive particles that have been modified with an oxide of at least one of yttrium, neodymium, lanthanum, cobalt, and magnesium.
12. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles are seeded ceramic alumina.
13. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles are non-seeded ceramic alumina.
14. (previously presented) A method of grinding a surface, the method comprising:
 - (a) providing a structured abrasive article comprising a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers dispersed in a binder; and
 - (ii) having a height, measured from the front face of the backing, of at least 500 micrometers;

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- (b) grinding the surface at a first time to obtain a first cut rate and a first surface finish; and
- (c) grinding the surface at a second time at least 20 minutes after the first time to obtain a second cut rate being no greater than 50% less than the first cut rate.

15. (original) The method according to claim 14, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time to obtain a second cut rate being no greater than 30% less than the first cut rate.

16. (original) The method according to claim 15, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time to obtain a second cut rate being no greater than 15% less than the first cut rate.

17. (original) The method according to claim 14, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time 30 minutes after the first time.

18. (original) A structured abrasive article comprising:

- (a) a backing having a front face;
- (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

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wherein the abrasive article, when using Test Procedure I, produces a first cut rate at Cycle 1 and a second cut rate at Cycle 240, the second cut rate being no greater than 15% less than the first cut rate.

19. (original) A structured abrasive article comprising:
- (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure II produces a first cut rate at Cycle 1 and a second cut rate at Cycle 12, the second cut rate being no greater than 50% less than the first cut rate.

20. (original) A structured abrasive article comprising:
- (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure III produces a first cut rate at Cycle 1 and a second cut rate at Cycle 30, the second cut rate is no greater than 30% less than the first cut rate.

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21. (original) A structured abrasive article comprising:
- (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure III, has a cut rate decrease over 30 cycles of no more than 50% of a comparative cut rate decrease,
wherein the comparative cut rate decrease is obtained by a conventional coated abrasive with make and size coats and gravity deposited fused aluminum oxide abrasive particle agglomerates using Test Procedure III.

22. (original) A method of making an abrasive article comprising:
- (a) providing a backing having a front face;
 - (b) applying a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of at least 85 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers.

23. (currently amended) The method of making the abrasive article according to claim 22, wherein the step of applying comprises:
- (a) providing a slurry comprising a binder precursor and the plurality of ceramic abrasive particles dispersed therein;

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- (b) providing a production tool having a plurality of cavities therein;
- (c) coating the slurry into the cavities;
- (d) contacting the slurry with the backing front face;
- (e) curing the binder precursor having the plurality of ceramic abrasive particles therein to form a cured binder having the plurality of ceramic abrasive particles therein; and
- (f) removing the slurry or the cured binder having the plurality of ceramic abrasive particles therein from the production tool.

24. (currently amended) The method according to claim 23, wherein the step of curing the binder precursor having the plurality of ceramic abrasive particles therein is done before the step of removing the slurry or the cured binder having the plurality of ceramic abrasive particles therein from the production tool, ~~thus resulting in removing the cured binder from the production tool.~~

25. (currently amended) The method according to claim 23, wherein the step of removing the slurry or the ~~current cured~~ binder having the plurality of ceramic abrasive particles therein from the production tool is done before the step of curing the binder precursor having the plurality of ceramic abrasive particles therein, ~~thus resulting in removing the slurry from the production tool.~~

26. (original) The method according to claim 23, wherein the step of coating the slurry into the cavities is done before the step of contacting the slurry with the backing front face.

27. (original) The method according to claim 23, wherein the step of contacting the slurry with the backing front face is done before the step of coating the slurry into the cavities.

28. (original) The method according to claim 23, wherein the step of providing a slurry comprises:

- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles having an average particle size of at least 200 micrometers.

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29. (previously presented) The method according to claim 23, wherein the step of providing a slurry comprises:
- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles having an average particle size of 100-400 micrometers.
30. (canceled)
31. (previously presented) The method according to claim 23, wherein the step of providing a slurry comprises:
- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles wherein the ceramic abrasive particles have been modified with at least one rare earth oxide modifier.
32. (previously presented) The method according to claim 23, wherein the step of providing a slurry comprises:
- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles, wherein the ceramic abrasive particles have been modified with an oxide from at least one of yttrium, neodymium, lanthanum, cobalt, and magnesium.
33. (original) The method according to claim 22, wherein the step of applying a plurality of abrasive composites on the front face comprises:
- (a) applying a plurality of abrasive composites, each of the abrasive composites having a height, measured from the front face of the backing, of at least 750 micrometers.
34. (previously presented) The method according to claim 22, wherein the step of applying a plurality of abrasive composites on the front face comprises:
- (a) applying a plurality of abrasive composites, each of the abrasive composites having faces that are defined by a parabolic function.